

cleaning process for a process chamber for semiconductor and/or flat panel display manufacturing, comprising the steps of:

converting a hydrofluoric acid to a mixture of hydrofluoric acid gas and said fluorine cleaning gas on-site but remote to the process chamber;

transferring the gas mixture to a cold trap;

converting said hydrofluoric acid gas to a liquid; and

separating said liquid hydrofluoric acid from said fluorine gas, said fluorine cleaning gas remaining in a gaseous state thereby generating said fluorine cleaning gas for utilization in said cleaning process.

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[Please amend claim 2 to read as follows:]

2. (amended) The method of claim 1,

wherein said fluorine cleaning gas is utilized through activation thereof to form reactive fluorine species to clean the process chamber, said reactive fluorine species formed inside the process chamber or said reactive fluorine species formed outside the process chamber and subsequently delivered to the process chamber.

[Please amend claim 3 to read as follows:]

3. (amended) The method of claim 2, wherein activation of said fluorine cleaning gas is via a plasma source, a heat source, or an electrical source.

[Please amend claim 4 to read as follows:]

4. (amended) The method of claim 3, wherein said plasma source is a microwave energy source or a radiofrequency energy source.

Please amend claim 7 to read as follows:

7. (amended) The method of claim 1, wherein converting said hydrofluoric acid is via electrolysis.

[Please amend claim 8 to read as follows:]

8. (amended) A method for cleaning a process chamber for semiconductor and/or flat panel display manufacturing, comprising the steps of:

generating a fluorine cleaning gas on-site with but remote to the process chamber, said generating step comprising:

converting hydrofluoric acid to a gas mixture of said hydrofluoric acid and said fluorine gas;

transferring the gas mixture to a cold trap and

converting said hydrofluoric acid gas into a liquid;

removing said liquid hydrofluoric acid from the cold trap, said fluorine cleaning gas remaining in a gaseous form; and

activating said fluorine cleaning gas to form fluorine radicals to clean the process chamber.

Sub C1  
a2  
[Please amend claim 9 to read as follows:]

9. (amended) The method of claim 8, wherein said fluorine cleaning gas is pumped into a storage unit prior to said activating step.

[Please amend claim 10 to read as follows:]

10. (amended) The method of claim 8, wherein said fluorine cleaning gas is activated to form fluorine radicals inside the process chamber or wherein said fluorine cleaning gas is activated to form fluorine radicals outside the process chamber, said fluorine radicals subsequently delivered to the process chamber.

[Please amend claim 11 to read as follows:]

Sub C1  
92 11. (amended) The method of claim 1-8, wherein activating said fluorine cleaning gas is via a plasma source, a heat source, or an electrical source.

[Please amend claim 12 to read as follows:]

12. (amended) The method of claim 11, wherein said plasma source is a microwave energy source or a radiofrequency energy source.

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Please amend claim 15 to read as follows:

Sub C1  
C13 15. (amended) The method of claim 14, wherein converting said hydrofluoric acid gas is via electrolysis.

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Please cancel claims 5-6 and 13-14.